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ROUGH NARRATIVE GROUPINGS

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1) Present Trends Continued

a) This plan is based on current trends of reasonable expectations regarding use with emphasis on projects or operations that would increase the state's usable water supply

b) I am assuming that many current trends will continue and that this will increase for water. I am also assuming that the existing water rights system will not change. Believes that waster transfers (aka MWD/ Palo Verde) will likely increase. Also believes that political conflict over water will continue.

c) As a trained historian, I give a lot of weight to perceived historical trends. I am uncomfortable speculating about trends that are not likely or that an interest group would like to see, even my own. Don't see a place for anything else in this document!

d) Theme - Historical and Current Trends Forecasted Future

e) My assumptions are population increased as projected. The weather stays historically the same. S. Cal gets the same amount of water. This is political reality. The environment gets same to more water. I believe this is reality.

f) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major policy or law changes. Adjust "optimization" process as necessary to reflect "reality" & re-run. 4) Develop both a "soft path" and "hard path" study plan 5) Analyzing strengths/weaknesses of soft path, hard path, & reoptimized trends, develop draft "preferred" plan. Continue to refine policies until you get the "best" possible mix of policies. 6) Take "Best Policies" & run under stressful scenarios -- eg, higher population, climate change, more stringent water quality rules, etc. Evaluate results to see which stressors the "best policies" handle well & which ones they don't. Develop additional policies to handle stressors that "best policies" don't handle well. (Approach also set out below)

2) A plausible Baseline

a) This plan, once again, is a baseline. Anything beyond a baseline projection, using the best information, increases the uncertainty as your assumed distance from it increases. The ability of this process certainly needs some assured "baseline" to determine the significance of any future charges. As was mentioned, a measurement of change from a

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reasonable baseline and establishment of those most influential changes is essential. You really need to bracket or compare the future "uncontrollables" to show which are the most influential. Then vary the "controllable solutions" to try and achieve some desirable future. You may need to separate your factors into 2 or more categories, different from what you currently have. There probably is no value in trying to balance the water and

b) likely/plausible/average hydrology, population and regulatory conditions, with efficiency and operation improvements.

c) A base case projecting existing resources and policies to 2030. It should tell us is we have problems, and if so where and under what types of circumstances.

3) Credible Futures Isolating for Particular Factors (Sensitivity Analyses)

a) My intent was to establish a credible future and isolate the impact of an increased conjunctive use management strategy. Essentially, like BJ's approach but more focused on a single management change. A sensitivity analysis.

b) This scenario represents a mix of things that I think are likely and some of the variations that need to be looked at. The "Basis" column should give an indication of assumptions made.

c) Liked concept mentioned in meeting of selecting most plausible future and possibly changing factors most likely to make significant positive/negative influence, especially those factors most controllable (I.e. integrated storage, urban stormwater).

d) Most factors remain at existing or current trends with additional climate variations. Like to test out how much water use efficiency and "soft path" management can mitigate.

e) Plausible worst-case scenario with incremental analyses of "soft path" solutions, concrete solutions. *Sensitivity analysis of importance of each element.*

f) Most factors remain at existing or current trends with additional climate variations. Like to test out how much water use efficiency and "soft path" management can mitigate.

g) This is just looking at weather and growth changes. Had 3 regards to ranges and basis.

h) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major

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4) Most Likely Cases

a) This is my best guess at the future - heavily dependent on increasing flexibility, particularly at the regional level. For example, a level 4.4 delivery to MWD and desert could also mean additional water to San Diego and possibly some water for Salton Sea.

b) Maximum efficiency of "best uses" of water approach. My approach was that of a strategic planner evaluating both historic data and projecting a likely future "physical scenario" for use (e.g. rainfall, population, impacts of likely trends). Kept the idea of a "balanced portfolio" in making decisions. Key Driver: population.

c) This theme represents my interpretation at a "most likely scenario". For most factors, they are current trends, repeat of history, etc. except for the following: Colorado - less than 4.4, additional land-based environmental water use, environmental flows - less stringent. Crop shifts - to permanent (which is the trend). Increased transfers, diminished storage (which I think is the trend).

d) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major policy or law changes. Adjust "optimization" process as necessary to reflect "reality" & re-run. 4) Develop both a "soft path" and "hard path" study plan 5) Analyzing strengths/weaknesses of soft path, hard path, & reoptimized trends, develop draft "preferred" plan. Continue to refine policies until you get the "best" possible mix of policies. 6) Take "Best Policies" & run under stressful scenarios -- eg, higher population, climate change, more stringent water quality rules, etc. Evaluate results to see which stressors the "best policies" handle well & which ones they don't. Develop additional policies to handle stressors that "best policies" don't handle well. *(Also set out above and below)*

5) What I'd Like to See

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a) I believe that the state has adequate supplies to handle the future and that we must get more efficient in the use of current supplies. Therefore, I want to see a scenario that will support this or show me that it is not correct.

b) I still need the "What I'd like to do" approach but modified, especially by Basis number.. .for example: storage- I marked an X in each box and evaluated it by the basis number--that reflects what I'd like to "see" and what I think will happen.

c) My overall theme was a vision for the future - what I would like to see. This includes healthier aquatic ecosystems, achieving and then maintaining sustainable agriculture, and providing enough water for urban centers. I was also realistic about certain trends that I believe, at this point in time, are now outside of our control (I.e. greater variability due to climate change). I relied on existing statistics (DOF) where available. I think that my study plan will be useful to the AC since it represents a realistic view of how we might achieve the environmental objectives of the environmental community without disregarding the water needs of ag and urban centers.

6) Stressed or "Worst Cases"

a) Most Stressed - worst case for IID/Region

b) Plausible worst-case scenario with incremental analyses of "soft path" solutions, concrete solutions. Sensitivity analysis of importance of each element. (Also listed above.)

c) Be interesting to see how a big increase in population and a decrease in water supply works. That's a worst case scenario for the business community.

d) Assume a stressed hydrology and high water demand. Efficiency and alternative sources to play a key role.

e) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major policy or law changes. Adjust "optimization" process as necessary to reflect "reality" & re-run. 4) Develop both a "soft path" and "hard path" study plan 5) Analyzing strengths/weaknesses of soft path, hard path, & reoptimized trends, develop draft "preferred" plan. Continue to refine policies until you get the "best" possible mix of policies. 6) Take "Best Policies" & run under stressful scenarios -- eg, higher population, climate change, more stringent water quality rules, etc. Evaluate results to see which stressors the "best policies" handle well & which ones they don't.

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7) Relaxed Regulatory Standards

a) Greater pressures on money and resources requires relaxation from the current regulatory environment. Result from this could include repeal of ESA and relaxed standards on ag discharge. Relaxed standards could mean less available groundwater storage because of contamination.

b) This study plan has government deregulation as its theme. This is reflected in such factors as lower drinking water standards and ag discharge requirements, less water for environmental use, urban encroachment, less financial support for BMPs, rec and (?) projects, etc.

8) Best Possible Case

a) The theme for this study plan would be to select the most optimistic combination of factors ("best possible" case) for all interests. This could represent an upper limit for the amount of water supply needed, which could be considered as the other side of the envelope of alternatives, from the "worst case" scenario. Once the upper and lower limits are quantified, then all other combinations should fall in between - these can sometimes be estimated using Interpolation. Interpolation is easier than Extrapolation.

9) Wet Cycle

a) Plausible wet cycle scenario with incremental analyses of soft and hard solutions. Note: What is needed to determine the usefulness of study plan B is to see if enough water can be stored to offset demands during study plan A, or how the system can refill after plan A. [Study Plan A: Plausible worst-case scenario with incremental analyses of "soft path" solutions, concrete solutions. Sensitivity analysis of importance of each element.]

10) Performance Test of Existing Physical System

a) RANGE1--Test the envelope of performance of the "existing" physical system. To see what problems might be addressed with existing facilities.

b) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major policy or law changes. Adjust "optimization" process as necessary to reflect "reality" & re-run. 4) Develop both a "soft path" and "hard path" study plan 5) Analyzing strengths/weaknesses of soft path, hard path, & reoptimized trends, develop draft "preferred" plan. Continue to refine

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11) Rethinking Current Allocations

a) There may be a call for increased public discussion of current allocations which have been treated as "given" by major stakeholders. This gives rise to "new" scenarios involving a conversion of California Agriculture toward organic/labor intensive alternatives and a transfer of substantial water that is not "purchased" by the public.

12) Weather Plus Growth Changes

a) This is just looking at weather and growth changes. Had 3 regards to ranges and basis.

13) Other Approaches, Comments and Multiple Themes

a) I would prefer to start with certain premises re: "exogenous" factors which set conditions overall-choose consistent range value to related factors; then make some policy assumptions and select consistent range values for associated factors. E.g.- hydrology associated with global warm effects. High energy costs (which will affect cost of pumping water, transporting water, treatment, etc.). Choose environmental quality (high water quality standards enforced, implemented; high environmental (?) water. Choose efficiency, "soft path Based on my knowledge of current circumstances and my anticipation of future developments. Serious concerns about CALFED funding to assure even ROD expectations for water use efficiency and environmental restoration are important factors. Additionally, major shifts in the water management practices of federal, state and local agencies, plus water users will be necessary if non-status quo outcomes are to be achieved.

b) 1) Develop plan reflecting trends & most likely events -- no reoperation etc. 2) Optimize plan 1 3) Analyze plan 2 to see why "optimized" is different from trends/most-likely. I suspect that mathematical optimization will suggest we do things that are not politically realistic without major policy or law changes. Adjust "optimization" process as necessary to reflect "reality" & re-run. 4) Develop both a "soft path" and "hard path" study plan 5) Analyzing strengths/weaknesses of soft path, hard path, & reoptimized trends, develop draft "preferred" plan. Continue to refine policies until you get the "best" possible mix of policies. 6) Take "Best Policies" & run under stressful scenarios -- eg, higher population, climate

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c) Low energy cost, desalting, and recycling = new technology. Colorado R Supply = 4.4- existing water law (basis) CR Allocation-- These exclusive ranges are not how I see it happening Crop shifts--my category is gone, crops that use more water, e.g. sugar cane. Ground Water-- better urban and ag runoff and technology (desalting) cleaner water, may not need more.

d) A "perfect" theme for Ag and Urban would like to see study of opposite for comparison. I see a need for regional considerations when we are composing the study plans. Water rights have to be a key consideration.

e) The so called "market based" water pricing, as an alternative to California's water rights system, is exclusive to new storage and conveyance investments. I cannot foresee a scenario in which an open market priced water resource, would be compatible with the capital and time investment necessary for new infrastructure . A market place for water works for private side actions. Those entities will not, w/out significant subsides, invest in facilities w/ such a long term return on investments. Perhaps subsidies such as those given to the transcontinental RR. Poverty would overcome this.

f) 1. Projected effects of climate changes---less snow, more rain and increased variability. 2. Present ability to quantify water resources limited. Projections are increasingly problematic based on inadequate present knowledge. 3. Role of water quality on limited future usability of water, especially ground water, not well represented.

g) Used a regional view and focused on climate and hydrology issues as they affect balance of State. Also looked at extended, near-drought conditions, and the advancement of technology.